

Socioeconomic Inequalities in Care Receipt at Older Ages: A Comparative European Study

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Motivation and aims: Recent reforms to long-term care (LTC) systems in many European countries have aimed to enhance the economic sustainability of LTC by incentivising home-based and/or family care over the direct provision of services (European Commission, 2018; Fernandez et al., 2016). In order to fully evaluate how such changes may impact the wellbeing of older people, it is important to understand what socioeconomic inequalities (if any) exist in the receipt of formal and/or informal home care across different LTC systems. Yet, the empirical evidence on this topic is limited and inconclusive (Rodrigues et al., 2018). As part of the new internationally funded IN-CARE (“Inequality in Care”) project (<http://in-care.fk12.tu-dortmund.de/>), we investigate socioeconomic status (SES) inequalities in the receipt of domiciliary formal and/or informal care among individuals aged 65+ with disabilities across different LTC systems in Europe. Our contribution to research on care inequalities is twofold. First, we generate a unique dataset of country-specific macro-indicators capturing distinctive features of each LTC system, to be made publicly available at the end of the project. Second, after linking the macro-indicators to large and comparable survey micro data, we investigate how different LTC system characteristics relate to inequalities in (in)formal care use.

Theoretical and empirical background: Theoretical evidence suggests that SES inequalities in the use of formal and informal care can be attributed to a combination of several factors. According to Andersen and Newman’s (2005) behavioural model of care use, the SES gradient in care receipt can be explained by differences in individual needs, predisposing factors, and social and material resources. Physical and cognitive health determine the need for care, which is generally higher among those in lower-SES groups as they tend to be in poorer health. Gender and age, which represent predisposing factors for care use, also vary by SES, as those with fewer resources are more likely to be female and older. Furthermore, social resources such as the availability of spouses and children as potential caregivers, and material resources, like the financial means to purchase care on the market, vary across SES groups (Broese Van Groenou et al., 2006). Andersen and Newman’s (2005) model implies that, once health status, predisposing factors, and social resources are controlled for, any residual SES disparities in care use reflect differences in individuals’ (and households’) material resources (Rodrigues et al., 2018).

The empirical evidence on the association between individual SES and care use is inconclusive. While some analyses find that, across Europe, individuals in lower-SES groups are more likely to receive informal and formal support (Broese Van Groenou et al., 2006), others find higher income, wealth and education to be linked to higher use of informal (Bakx et al., 2015) and formal care (Albertini & Pavolini, 2017). In general, SES may impact on care use through different channels. Education may facilitate access to formal care services by enhancing individuals’ ability to navigate the LTC system, while higher incomes are likely to increase the affordability of formal care (Rodrigues et al., 2018). Financial and housing wealth may incentivise informal care from kin in return for transfers and bequests (Rodrigues et al., 2018), while access to a car in the household may decrease dependence on informal caregivers (Vlachantoni et al., 2015). This suggests that different dimensions of individual SES should be analysed simultaneously as correlates of care receipt.

The literature on inequalities in care receipt across different LTC systems is limited. Some recent studies have suggested that countries with widespread public service provision and higher expenditure on LTC are characterised by more equal access to formal domiciliary care across SES groups (Albertini & Pavolini, 2017; Carrieri et al., 2017). Inequalities in informal care receipt across different LTC systems are, instead, understudied (Broese Van Groenou et al., 2006). Moreover, existing cross-national studies on care inequalities either compare a small set of countries, thus only providing qualitative descriptions of their LTC systems (Albertini & Pavolini, 2017; Broese Van Groenou et al., 2006); or, conversely, they cluster countries into macro-groups based on single LTC indicators (e.g. public expenditure), thus concealing considerable within-group variation (Carrieri et al., 2017).

In this study we investigate inequalities in care use along several SES dimensions (income, wealth, education, home and car ownership) and how these inequalities vary across LTC systems in Europe. Based on existing classifications of LTC systems (Kraus et al., 2010; Saraceno, 2016), we collect a theoretically driven and up-to-date dataset of country-specific indicators capturing key features of LTC systems, including public expenditure, financing, public service provision and financial support for caregivers and recipients. After identifying those indicators that most closely represent the distinct

features of the LTC system, we use these as macro-level predictors in our analysis of inequalities in care. This approach avoids clustering countries into broad LTC typologies. Conversely, it enables us to shed light on how specific features of a LTC system may contribute to alleviating or exacerbating inequalities in formal and informal care use among disabled older adults.

Data and Method:

Data and sample selection: We use data from the 6th wave of the Survey of Health, Ageing and Retirement in Europe (SHARE), and from the 7th wave of the English Longitudinal Study of Ageing (ELSA), both collected in 2015. We include data on 17 countries, namely Austria, Belgium, Czech Republic, Denmark, England & Wales, Estonia, France, Germany, Greece, Italy, Luxembourg, Poland, Portugal, Slovenia, Spain, Sweden and Switzerland. SHARE and ELSA provide detailed information on older individuals' demographic, health, socioeconomic and family characteristics, as well as on their use of informal and formal care. Additionally, we incorporate retrospective information on respondents' marital and cohabiting unions from the SHARE and ELSA life-history waves (SHARE 3 and 7; ELSA 3). In order to isolate individuals with care needs, we focus on a sample of 18,506 adults aged 65+ with self-reported limitations in at least one Activity of Daily Living (ADL), such as dressing and bathing, or one mobility task, such as walking 100 metres and climbing stairs (Rodriguez, 2014).

Care use: We define care use as the receipt of personal care over the 12 months preceding the interview (4 weeks in ELSA). Personal care includes help with tasks such as dressing, walking, showering or eating, excluding help with household chores or paperwork. We generate a categorical variable for whether respondents report having received i) *no care* (82.4% of the analytical sample); ii) exclusively *informal care* from kin or non-kin living in or outside their household (10.3%); iii) exclusively *formal care* in the form of professional or paid domiciliary care services (3.9%); or iv) a combination of informal and formal care – *mixed care* (3.5%).

SES indicators: We model care use as a function of several SES indicators, namely: education, categorised as low (up to lower secondary), intermediate (upper secondary) and high (university or higher); dummy variables for couple-level income quintiles and financial wealth quintiles (computed by country); and binary indicators of home ownership (or social tenancy) and presence of a car in the household.

LTC system indicators: Our research team is currently compiling a macro-level dataset that contains a range of LTC system indicators for European countries covering the period between the early 2000s and 2017, obtained from various sources (e.g. Eurostat, 2019; OECD, 2019). These include indicators for public LTC expenditure, number of beds in residential LTC facilities, and the monetary amount of any public cash-for-care benefits. Some of the indicators are available both as country averages and at the regional (NUTS-2) level. In this extended abstract, we present results for a single country-level indicator of the generosity of the LTC system, namely the total LTC expenditure as % of GDP (OECD, 2019), adjusted for the relative size of the 65+ population to account for the overall need for care in each country (Kraus et al., 2010). Summary statistics for this indicator by country are presented in Supplementary Table 1.

Estimation method: We estimate multilevel multinomial logistic regressions, with individuals nested within countries. Our care-use outcomes are *no care*, *informal care only*, *formal care only*, and *mixed care*. Following Andersen and Newman's (2005) framework, we compute adjusted SES differences in care use controlling for need (number of ADL, IADL and mobility limitations; chronic conditions; self-rated health; and cognitive function); predisposing factors (gender and age); and social resources (current marital status, total number of marital and coresidential unions, and an indicator combining parental status with the presence of coresident children). In our preliminary analysis, we incorporate our indicator of needs-adjusted LTC expenditure as a country-level predictor of care use in the model. For each SES indicator (e.g. income), we estimate a model including a random slope for that indicator and its cross-level interaction with LTC expenditure (Heisig & Schaeffer, 2019). The coefficient on the cross-level interaction represents the extent to which SES inequalities in the receipt of different forms of care vary across countries with different levels of LTC expenditure.

Planned further analysis: Given that the number of countries in our analysis is relatively small, the coefficients on the country-level indicators and cross-level interactions may not reliably estimate the quantities of interest, and their standard errors are likely to be underestimated (Bryan & Jenkins, 2016). Moreover, using countries as the only level of clustering may be overly simplistic, since regional heterogeneity in LTC system characteristics within countries is often

substantial (OECD, 2019). Thus, we extend our analysis in two ways. First, we estimate Bayesian multilevel multinomial models using the “brms” package in R (Bürkner, 2018). Relative to the “frequentist” approach, Bayesian methods have been found to be more robust to a small number of clusters, as they better account for the uncertainty in the parameters across their plausible range (Bryan & Jenkins, 2016). Second, we employ LTC indicators available at the regional level and estimate a model with individuals nested within NUTS-2 regions (within countries) .

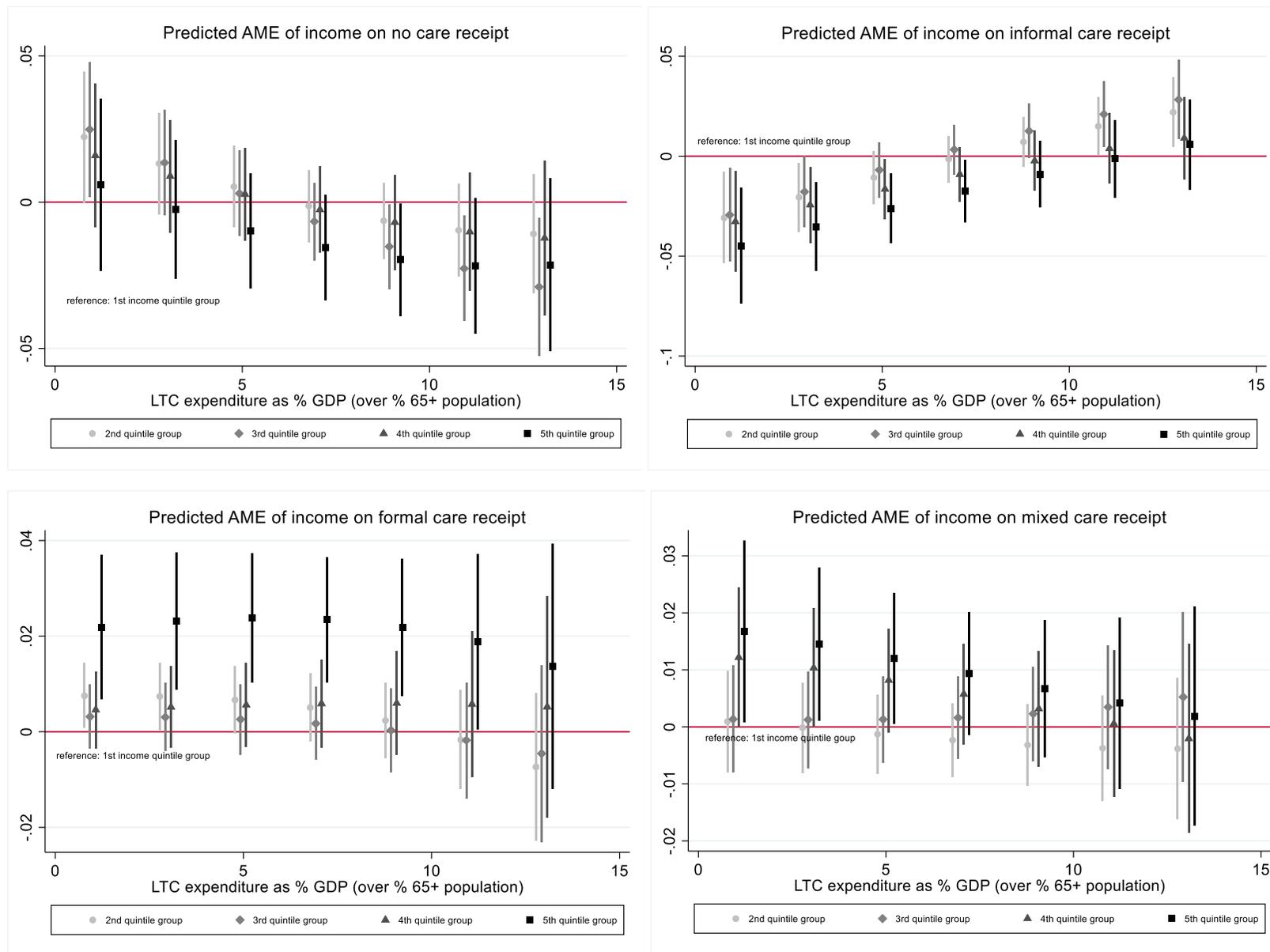
Preliminary findings: We first estimate a baseline random-intercepts multinomial model with no cross-level interactions, to provide a descriptive picture of SES inequalities in care receipt across all countries in our sample, as well as of the association between LTC expenditure and care receipt. Results, included in Supplementary Table 2, show that individuals in countries with higher LTC expenditure are relatively more likely to receive formal or mixed care, and less likely to receive no care or to rely exclusively on informal care.

We then estimate our multilevel multinomial model with country-level random intercepts, random slopes for income, and a cross-level interaction between LTC expenditure and income quintiles groups, which allows us to test for how income-related differences in care use vary across countries with different levels of LTC expenditure. Figure 1 graphically illustrates the results by plotting the predicted change (i.e. the average marginal effect or AME) in the probability of receiving each type of care (*no care; informal only; formal only; mixed care*) associated with being in the 2nd, 3rd, 4th or 5th income quintile group (with respect to the 1st), for different levels of needs-adjusted LTC expenditure, which varies from 0.7% (Greece) to 14.9% (Sweden) in our sample. The results clearly indicate that income inequalities in care use vary across countries with different levels of LTC expenditure. Poorer individuals are more likely than richer individuals to rely exclusively on informal care in countries where needs-adjusted LTC expenditure is low (below 7.5% of GDP), while there is no income gradient in informal care use in countries where LTC expenditure is high. By contrast, disabled older adults in the richest income quintile group are around 20 percentage points more likely to rely exclusively on formal home care than those in the poorest quintile group, but this inequality becomes weaker for levels of LTC expenditure above 12% of GDP. Moreover, higher-income individuals are more likely than poorer individuals to rely on mixed forms of care in countries where needs-adjusted LTC expenditure is below 6% of GDP. This suggests that, in countries with less generous public LTC systems, the rich are more likely to rely on formal and mixed care, while the poor are more likely to rely exclusively on informal care from family members and friends.

The estimates obtained by interacting LTC expenditure with wealth and car ownership (not shown) suggest that individuals at the bottom of the household wealth distribution are more likely to receive mixed care, but this “pro-poor” gradient is only present in countries with high LTC expenditure. Consistent with the results for income, we find that not having a car in the household is more strongly associated with the probability of exclusively receiving informal care in countries with low LTC expenditure, and more strongly associated with using exclusively formal care in countries with high LTC expenditure. We find no differences in care use by education or housing tenure (Supplementary Table 2).

Discussion and expected findings: The preliminary results confirm our expectations that: i) different dimensions of SES influence the use of formal and informal care through different pathways; and ii) the generosity of the LTC system shapes inequalities in care receipt. The strongest SES predictors of care use are couple-level income and ownership of a car, two indicators of current financial resources. Individuals with low resources (low income, no car) are most likely to rely exclusively on informal care and least likely to rely on formal and mixed care in countries with relatively low needs-adjusted LTC expenditure (such as Greece, Portugal, Estonia and Poland). By contrast, in countries with high LTC expenditure (such as Sweden, Denmark, Switzerland and Belgium) we find no income inequality in formal care receipt, while the wealth gradient in mixed care appears to favour low-SES individuals. This suggests that more generous LTC systems may act to successfully redistribute access to formal care services, which may incentivise complementary forms of care from kin and non-kin among disadvantaged groups (Albertini & Pavolini, 2017). Preliminary findings from the Bayesian multilevel models broadly confirm our results. We will then extend the analysis to indicators of other LTC system characteristics. Based on previous theoretical arguments (Saraceno, 2010, 2016), we expect countries with stronger financial support for family care (e.g. through cash-for-care allowances for caregivers) to display pro-poor gradients in informal care use, and pro-rich gradients in formal care. In fact, families in lower-SES groups may be more likely to keep the cash benefits and provide care themselves, while higher-SES families may use the cash from public benefits to purchase care privately on the market (Saraceno, 2010). The multilevel models with regional clusters will inform us about internal heterogeneity in LTC system characteristics and inequalities in care use, which is likely to be substantial in some of the countries under study (OECD, 2019).

Figure 1. Predicted average marginal effects of being in each income quintile group (as opposed to the bottom) on each type of care receipt, with 95% confidence intervals



Appendix: Supplementary tables

Supplementary Table 1. Needs-adjusted long-term care expenditure in 2015 by country (highest to lowest).

Country	A. LTC expenditure as % GDP	B. % population 65+ over total population	C. needs-adjusted LTC expenditure (=A/B*100)
Sweden	2.92	19.60	14.87
Denmark	2.53	19.00	13.31
Switzerland	2.39	18.00	13.25
Belgium	2.38	18.10	13.13
United Kingdom	1.88	18.00	10.44
Germany	2.06	21.20	9.72
France	1.72	18.90	9.12
Austria	1.53	18.80	8.14
Luxembourg	1.01	14.00	7.19
Czech Republic	1.00	18.00	5.54
Slovenia	0.80	18.00	4.43
Spain	0.82	18.60	4.41
Italy	0.94	21.90	4.27
Poland	0.39	15.70	2.49
Estonia	0.38	18.80	2.03
Portugal	0.24	20.80	1.16
Greece	0.14	20.80	0.69

Sources: OECD (2019); UN (2019); authors' own calculations.

Supplementary Table 2. Average marginal effects with 95% confidence intervals from the random-intercepts multinomial logit model of care use.

	NO CARE	INFORMAL CARE ONLY	FORMAL CARE ONLY	MIXED CARE
Average predicted probability	0.826 (0.812 ; 0.840)	0.102 (0.093 ; 0.111)	0.038 (0.034 ; 0.043)	0.034 (0.031 ; 0.037)
	AME (CI)	AME (CI)	AME (CI)	AME (CI)
Education (low)				
Intermediate	- 0.001 (-0.011 ; 0.010)	0.003 (-0.006 ; 0.013)	- 0.002 (-0.008 ; 0.004)	- 0.001 (-0.006 ; 0.005)
High	- 0.003 (-0.018 ; 0.011)	- 0.007 (-0.020 ; 0.007)	0.005 (-0.004 ; 0.014)	0.005 (-0.004 ; 0.014)
Income quintile group (1 st)				
2 nd	0.001 (-0.011 ; 0.014)	- 0.002 (-0.013 ; 0.010)	0.002 (-0.005 ; 0.009)	- 0.002 (-0.008 ; 0.005)
3 rd	- 0.004 (-0.017 ; 0.009)	0.002 (-0.010 ; 0.014)	0.000 (-0.008 ; 0.007)	0.002 (-0.005 ; 0.009)
4 th	- 0.001 (-0.016 ; 0.014)	- 0.010 (-0.023 ; 0.004)	0.004 (-0.005 ; 0.014)	0.006 (-0.002 ; 0.015)
5 th	- 0.012 (-0.029 ; 0.006)	- 0.018 (-0.033 ; -0.002)	0.019 (0.007 ; 0.032)	0.010 (0.000 ; 0.021)
Financial wealth quint. (1 st)				
2 nd	0.000 (-0.013 ; 0.012)	0.000 (-0.011 ; 0.011)	0.004 (-0.003 ; 0.011)	- 0.004 (-0.010 ; 0.003)
3 rd	- 0.007 (-0.020 ; 0.007)	- 0.002 (-0.014 ; 0.010)	0.009 (0.001 ; 0.018)	- 0.001 (-0.008 ; 0.007)
4 th	0.012 (-0.002 ; 0.026)	0.001 (-0.012 ; 0.014)	- 0.007 (-0.015 ; 0.000)	- 0.007 (-0.015 ; 0.000)
5 th	0.013 (-0.002 ; 0.029)	0.009 (-0.005 ; 0.024)	- 0.005 (-0.015 ; 0.004)	- 0.017 (-0.025 ; -0.009)
Homeowner (no)				
Yes	0.006 (-0.004 ; 0.017)	0.001 (-0.009 ; 0.010)	- 0.003 (-0.009 ; 0.003)	- 0.004 (-0.010 ; 0.001)
Access to a car (no)				
Yes	0.014 (0.003 ; 0.026)	0.010 (0.000 ; 0.020)	- 0.022 (-0.029 ; -0.015)	- 0.001 (-0.008 ; 0.005)
Need-adjusted LTC expenditure	- 0.003 (-0.006 ; 0.000)	- 0.003 (-0.005 ; -0.001)	0.004 (0.003 ; 0.005)	0.001 (0.001 ; 0.002)
Health status	X	X	X	X
Predisposing factors	X	X	X	X
Social resources	X	X	X	X
number of observations			18,506	
var(random effect)			0.101 (0.046 ; 0.224)	

Note: average marginal effects are in **bold** if the 95% confidence interval does not substantially overlap with 0 (0 indicates no association).

Health status: number of ADL, number of IADL, number of mobility limitations, presence of diagnosed chronic conditions (excluding hypertension), self-rated health, low cognitive function;

Predisposing factors: gender, age;

Social resources: marital status, parent status (childless, with coresident children, with non-coresident children), total number of marital or cohabiting unions during life course.

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